

EC/JRC Nuclear Science Training Course with Nucleonica
ITRAC-3: 3rd Training Course on Illicit Trafficking and Radiological Consequences with NUCLEONICA
11-13 May 2011

Nucleonica Overview

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What is Nucleonica?

Who is Nucleonica aimed at?

How can Nucleonica help you?

Nucleonica Architecture & Logical Structure...

Nucleonica Knowledge Objects

NUCLEONICA as a platform for scientific applications development

Key Advantages of Nucleonica



What is Nucleonica?

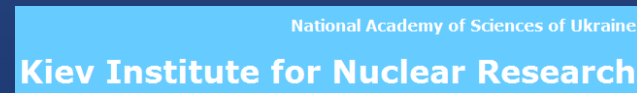
- As a result of recent developments on issues such as energy security and sustainability, nuclear safety, security, and non-proliferation, and protection of the environment, we are witnessing a resurgence of interest in nuclear power and the nuclear sciences in general.
- In order to support this renewed interest in the nuclear sciences, we will need a nuclear skills renaissance and it is within this context that the Nucleonica nuclear science web portal (www.nucleonica.com) has been developed.
- With its roots in the traditional paper-based Karlsruhe Nuclide Chart, Nucleonica has grown to become the leading online resource in the nuclear sciences. Nucleonica is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain.



Who is Nucleonica aimed at?

- Nucleonica is aimed at scientists, engineers and technical personnel working in the fields of nuclear power, health physics, radiation protection, nuclear and radiochemistry, decommissioning, nuclear medicine, etc. Nucleonica is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain.
- It can also be used by professionals for everyday calculations, obtaining quick results in various fields of applications and testing, validating and verifying complex computer models.
- Nucleonica also provides a range of consultancy services and industry cooperations. Examples of some recent studies include an analysis of the handling problems arising in the dismantling of radioactive sources, a decommissioning study of neutron sources, shielding analysis for a minor actinide laboratory, and a comparison of the radiotoxicities of wastes from fission, fusion, and coal fired power stations.

Our Customers & Partners include...



How can Nucleonica help you?

- Nucleonica provides you with user friendly access to the latest reference data from internationally evaluated nuclear data.
- A unique feature is the wide range of web-based nuclear science applications for decay calculations, dosimetry & shielding, etc.
- A variety of networking tools are provided for scientific collaboration.
- In addition Nucleonica offers a range of introductory and advanced training courses in various areas of nuclear science. One of the main aims of these courses is to contribute to establishing a safety culture among the scientists and especially the younger scientists. This safety culture is a necessary prerequisite for a general acceptance of nuclear energy worldwide.



Nucleonica is already being used by thousands of scientists and students worldwide in over 92 countries. Due to its advanced IT features, user friendly and intuitive environment, the platform has recently been endorsed by the Sustainable Nuclear Energy Technology Platform (www.snetp.eu):



“Nucleonica plays ... an important role in making nuclear education more attractive and in building nuclear knowledge for a new generation of engineers and scientists”

Nucleonica...

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 ... web driven nuclear science

Wednesday, September 23, 2009

Home

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Nucleonica - web driven nuclear science



NUCLEONICA HOT TOPICS

>> New Nucleonica Training Course... ITRAC-2
August 17, 2009

The 2nd Advanced Training Course on Illicit Trafficking and Radiological Consequences (ITRAC-2) with NUCLEONICA will take place at ITU, Karlsruhe from

KARLSRUHE NUCLIDE CHART

>> Karlsruhe Nuclide Chart special event on 9th Dec. 2008
Januar 09, 2009

New book now available!...for more information click link

NUCLEONICA is a new nuclear science web portal from the European Commission's Joint Research Centre. The portal provides a customisable, integrated environment and collaboration platform for the nuclear sciences using the latest Internet "Web 2.0" dynamic technology.

NUCLEONICA is aimed at professionals, academics and students working with radionuclides in fields as diverse as the life sciences (e.g. biology, medicine, agriculture), the earth sciences (geology, meteorology, environmental science) and the more traditional disciplines such as nuclear power, health physics and radiation protection, nuclear and radiochemistry, and astrophysics. It is also used as a knowledge management tool to preserve nuclear knowledge built up over many decades by creating modern web-based versions of so-called legacy computer codes.

NUCLEONICA provides "software as a service" on the web rather than through installed software, adding a greater level of stability and security and avoiding version compatibility and update problems. In addition, all NUCLEONICA's web applications are browser and operating system independent and can therefore be accessed by most web browsers.

NUCLEONICA offers the following main features:

NUCLEAR NEWS

N-energy benefits should not remain confined to few: PM
SEP 30 Manmohan Singh today said benefits of atomic energy should not remain confined to a 'privileged few' as it was vital to meet power requirements of developing countries. [...]

For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations)
SEP 30 For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations) [...]

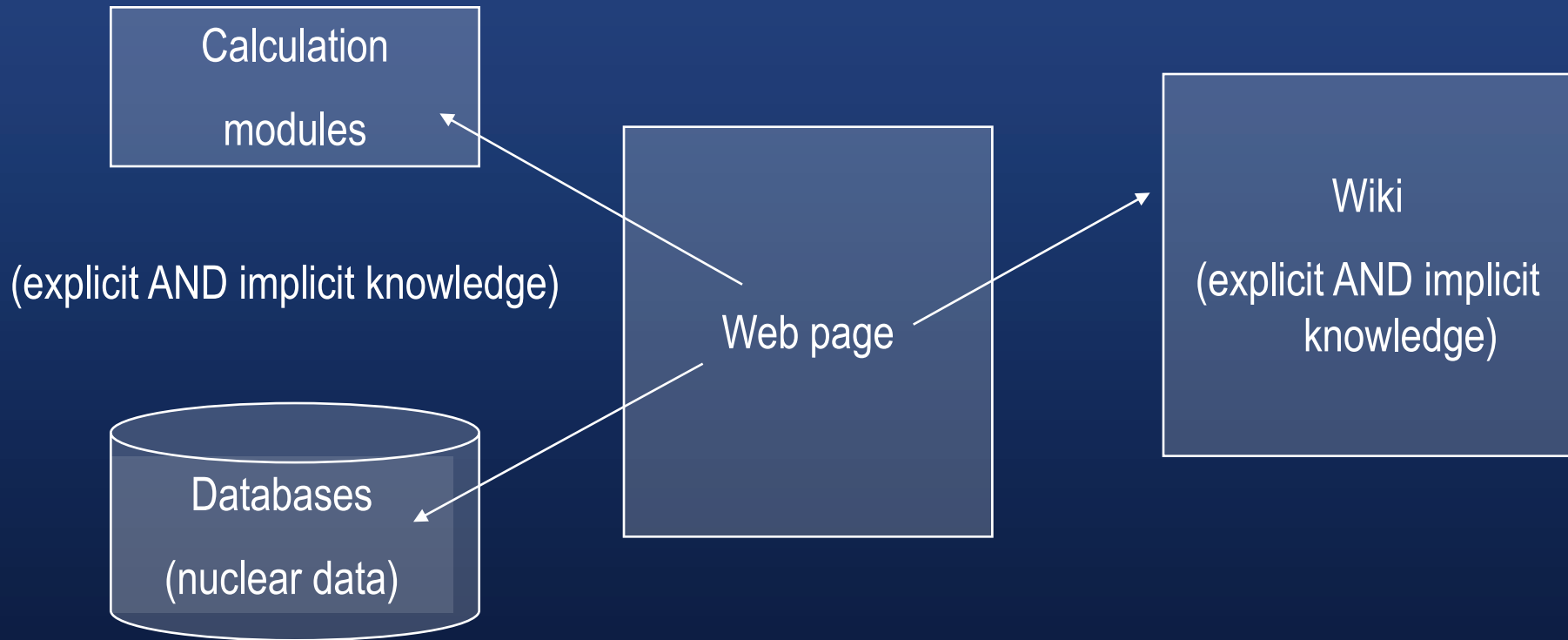
Analysis: Iran plant could defer Israel strike
SEP 30 JERUSALEM (AP) — It may seem counterintuitive, but the news that Iran has a second, clandestine uranium enrichment plant, and has just test-fired long-range missiles, could actually put off any plans [...]

India's allotment for nuclear parks hailed
SEP 30 The US India Business Council has welcomed India's move to reserve sites for the US commercial nuclear technology and described it as a significant step towards implementing the US-India civil nuclear [...]

Bulgaria Belene Nuclear Plant to Bring EUR 80 B over 60 years
SEP If built, the Bulgarian B...

The NUCLEONICA Nuclear Science Portal

Nucleonica Architecture & Logical Structure...



The NUCLEONICA Structure

Nucleonica Contents

What is Nucleonica?

Nuclear Data

Nuclide Explorer

DataSheets

Nuclear Data Retrieval

Fission Yields

Universal Nuclide Chart

Karlsruhe Nuclide Chart

Tools

webGraph

Scientific Calculator and Conference Calendar

Nuclide Mixtures

Gamma Library Creation

Nucleonica Scripting

Applications

10. Mass Activity Calculator

11. Decay Engine

12. Decay Engine for Large Nuclide Sets

13. Gamma Dosimetry & Shielding

14. Range & Stopping Power

15. webKORIGEN

16. Neutron Activation with webKORIGEN

17. Gamma Spectrum Generator

18. Cambio File Converter

19. WESPA web spectrum analyser

20. In Silico Dosimetry

Networking

Register as a Nucleonica User

Wiki, Blog, Forum and Nuclear News

Nuclear Science Training Courses

Four Pillars of NUCLEONICA: Nucleonica's "Learning Centres"

- Data Centre

The screenshot shows the 'Nuclear Data Retrieval' page. It features a search bar with 'Nucleonica/JEFF-3.1' selected. Below it, there are tabs for 'Nucleid Search', 'Radiation Search', and 'Advanced Search'. The 'Radiation Search' tab is active, showing a search form with fields for Energy (300 keV), Alpha (selected), Z, Element, Mass number, and Half-life. A 'Search' button is at the bottom. Below the search form, it says 'Search returned 6 results' and displays a table of nuclides.

Nuclides	Gamma and X-Rays (keV)	Emission Probability	Half-life
60 Nd 151	900.2	0.001463	12.44 (± 7) m
95 Am 241	899	6.84E-10	432.8 (± 7) y
60 Nd 151	600.8	0.0002527	12.44 (± 7) m
95 Am 241	599.6	2.232E-09	432.8 (± 7) y
60 Nd 151	300.58	0.018221	12.44 (± 7) m
95 Am 241	300.2	1.188E-07	432.8 (± 7) y

- Application Centre

The screenshot shows the 'Application Centre' page. It features a navigation menu with links to 'Mass Activity Calculator', 'Decay Engine', 'Dosimetry & Shielding', 'Range & Stopping Power', 'webKORIGEN', 'Universal Nuclide Chart', 'Transport & Packaging', 'Nuclide mixtures', 'Nucleonica Scripting', 'Library creation for 3rd party software', 'Radiological Dispersion Module', and 'Extended Graph Module'. There is also a 'Search Nucleonica Documentation' section with a search bar and a 'Nuclear Data Retrieval' link. A 'Welcome, Joe' message is visible on the right side.

- Knowledge Centre

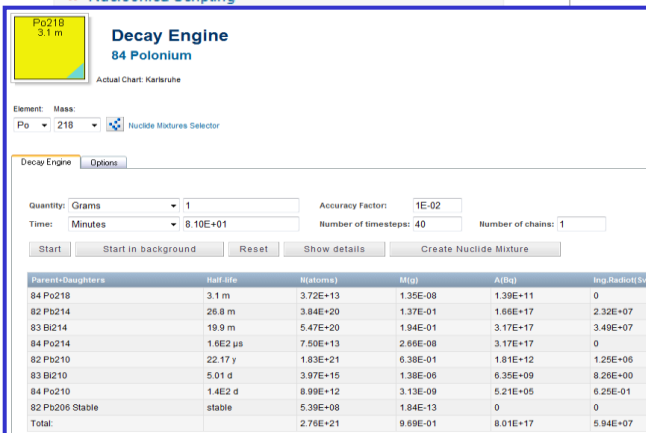
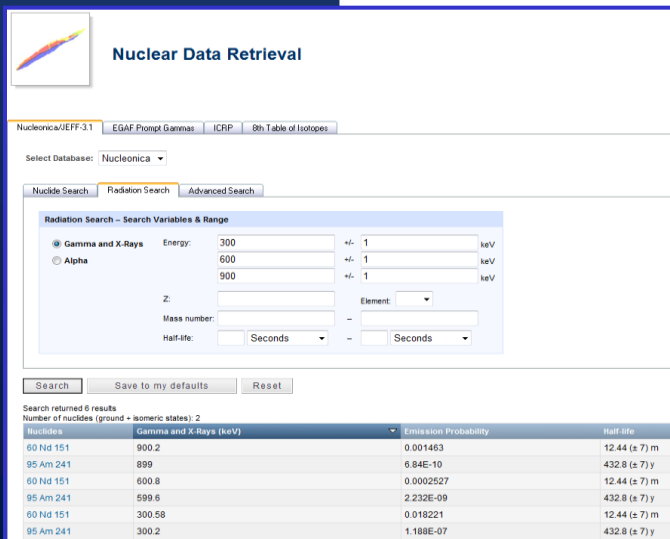
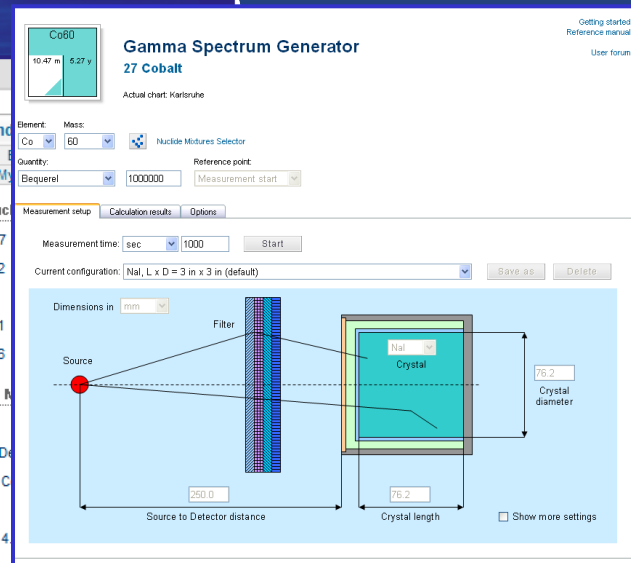
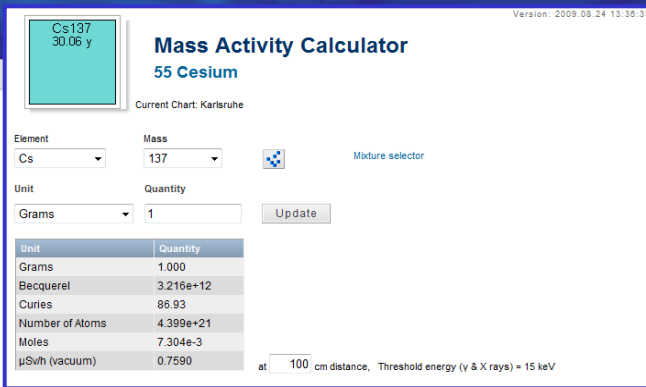
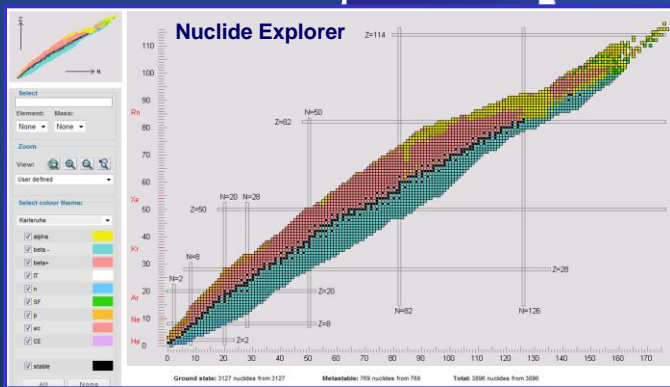
The screenshot shows the 'Knowledge Centre' page. It features a navigation menu with links to 'Start', 'My Profile', 'My Contacts', 'My Mailbox', and 'My Groups'. There are sections for 'Free Applications' (Forum, Conference Calendar, Graphics Module) and 'Upgrade Applications' (Nuclear science). A 'Coming soon' section lists upcoming events like 'Open call for JRC Traineeships' and 'Proceedings of the 9th Nucleonica Training Course now available'. A 'Welcome, Joe' message is visible on the right side.

- Community/Networking Centre

The screenshot shows the 'Community/Networking Centre' page. It features a 'Welcome, Joe' message and a 'My Profile' section. There is a 'My Community Events' section with links to 'You have 0 new messages' and 'You have 0 new contact list requests'. A 'Recent Nucleonica Members' section lists members like 'Enna Gdu', 'Constantin Gdile', 'Adrian Timotei', and 'Ivona Locomu'. A 'Pending Contacts' section lists contacts like 'MARTINA ADONI', 'Alejandro Schenker-Ferrero', 'Mikael Andersson', 'Martin Badertscher', 'Ramiquss Salamczyk', 'Enrico Barbina', 'Valerio Barbina', 'Soren Becker', 'Fabio Belloni', 'Andrey Berlov', 'Yuri Blodid', 'Enrico BOSSE', 'Serban Catinbaya', 'Yvonne Chude', and 'Catalina Chiu'.

The screenshot shows the 'Profile/Contacts' page. It features a 'Welcome, Joe' message and a 'My Profile' section. There is a 'My Community Events' section with links to 'You have 0 new messages' and 'You have 0 new contact list requests'. A 'Recent Nucleonica Members' section lists members like 'Enna Gdu', 'Constantin Gdile', 'Adrian Timotei', and 'Ivona Locomu'. A 'Pending Contacts' section lists contacts like 'MARTINA ADONI', 'Alejandro Schenker-Ferrero', 'Mikael Andersson', 'Martin Badertscher', 'Ramiquss Salamczyk', 'Enrico Barbina', 'Valerio Barbina', 'Soren Becker', 'Fabio Belloni', 'Andrey Berlov', 'Yuri Blodid', 'Enrico BOSSE', 'Serban Catinbaya', 'Yvonne Chude', and 'Catalina Chiu'.

Nucleonica's unique feature: Web-based Nuclear Science Applications



NUCLEONICA as a platform for scientific applications development

- Currently NUCLEONICA consists of individual modules
- Modules can be “combined” for batch processing through the NUCLEONICA scripting language
- Open up NUCLEONICA to external developers
 - checklist of tools required:
 - access to the NUCLEONICA databases
 - a testing environment where the developer and the NUCLEONICA team can test new application
 - an upload facility whereby the developer can upload the application to the NUCLEONICA platform

Recent Example: development of an *In silico* dosimetry module



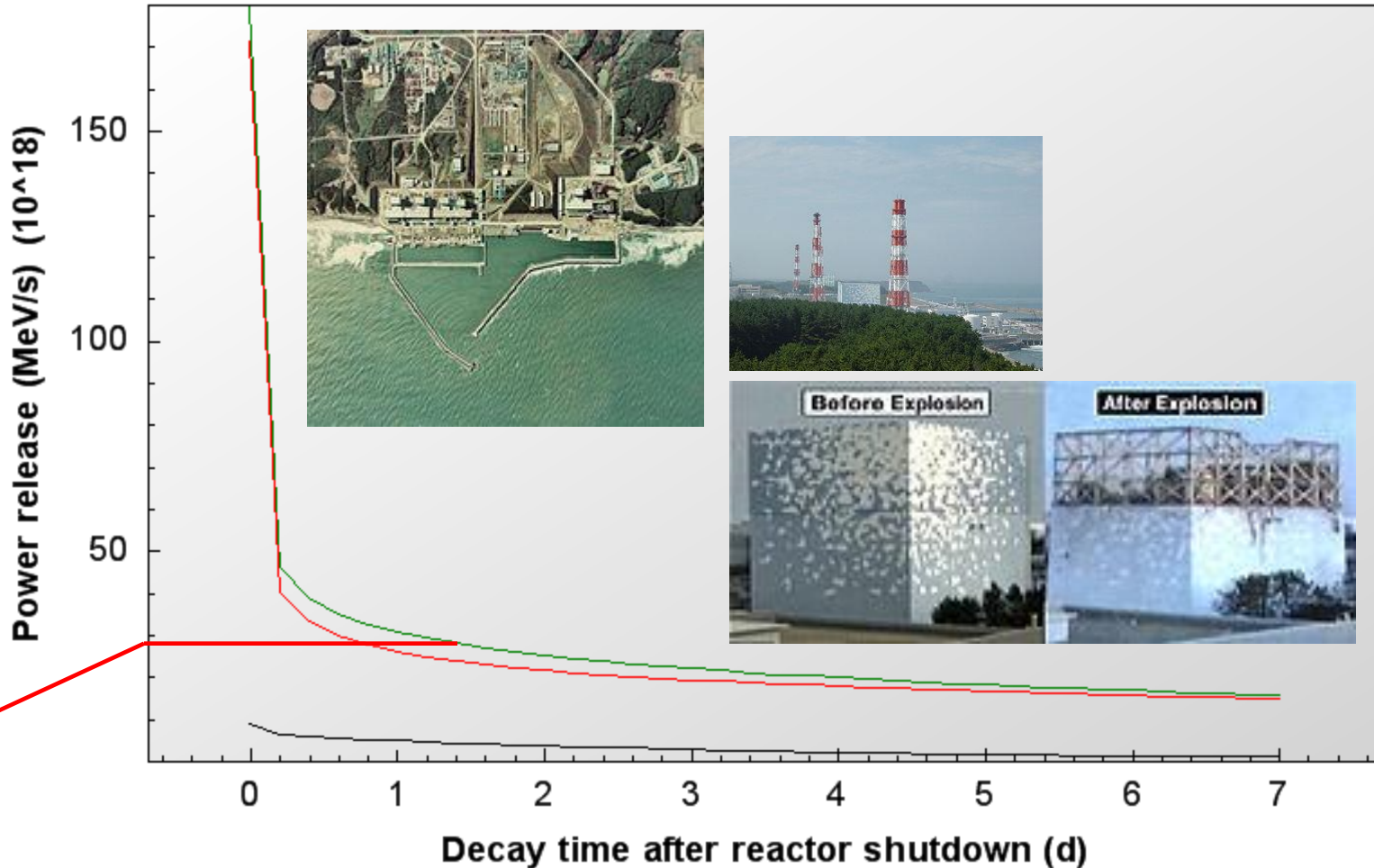
Conclusions: Key Advantages of Nucleonica

- Keep informed with the latest news on nuclear issues
- Use internationally evaluated nuclear data in your work
- Extensive range of nuclear science applications
- Manage all your data in a single browser-based system and keep track of your recent activities
- Prepare a lecture or a training course with Nucleonica materials (graphics. etc.)
- Prepare publication quality scientific graphs
- Stay in contact with your colleagues from previous employment, workshops or conferences
- Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community



Fukushima I Nuclear Power Plant, 460 MW

Power release during 7 d decay of 60 tHM BWR UOX 40 MWd/kg

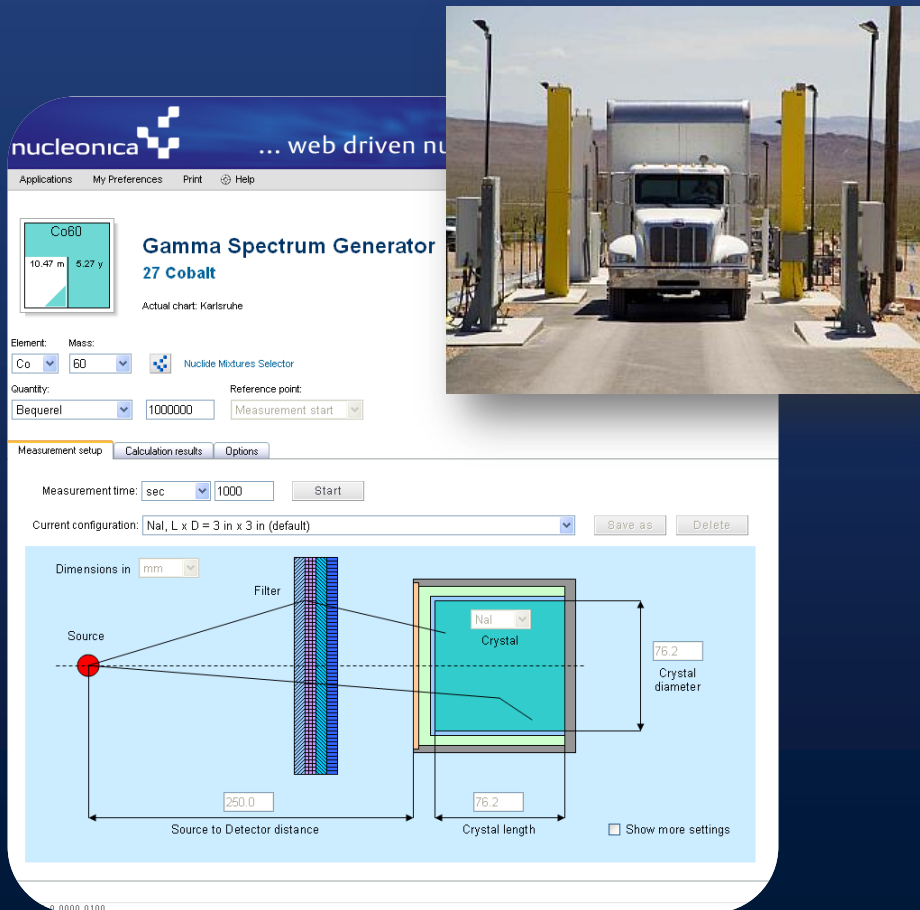


Example: Nucleonica's Gamma Spectrum Generator

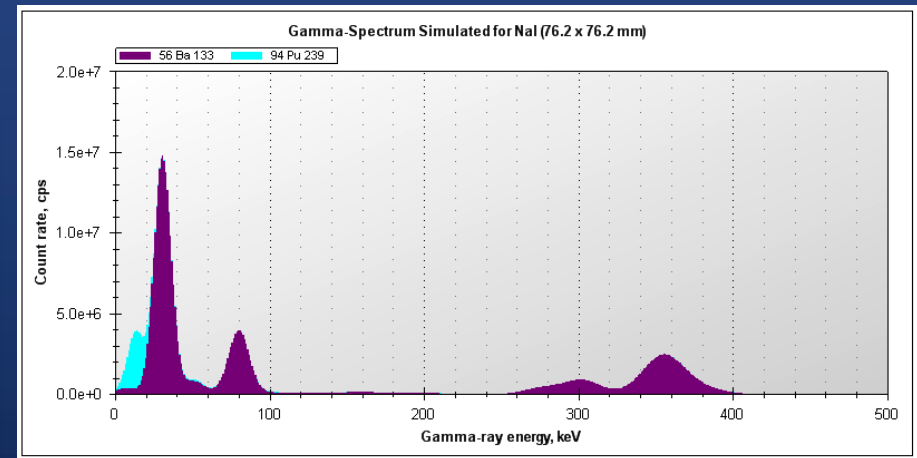
Concealed fissile material:

Medical Isotope Ba-133, 1 Ci (4 mg)

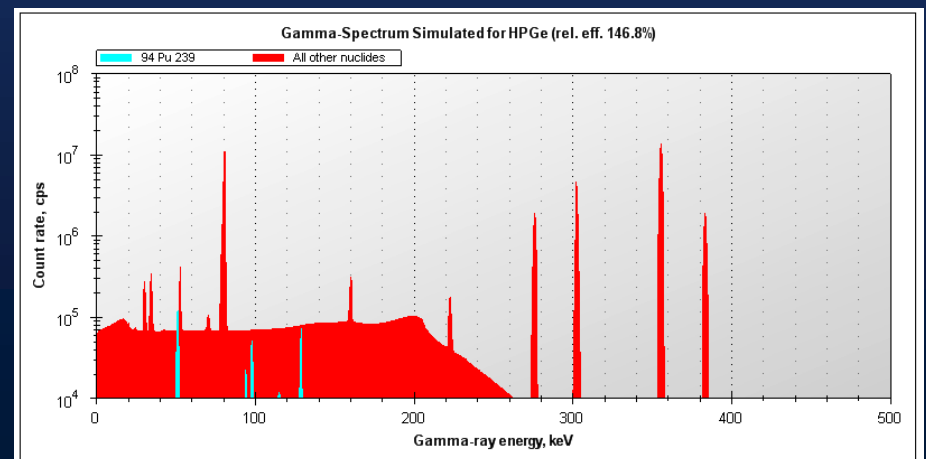
Weapon grade Pu-239 (500g)



NaI



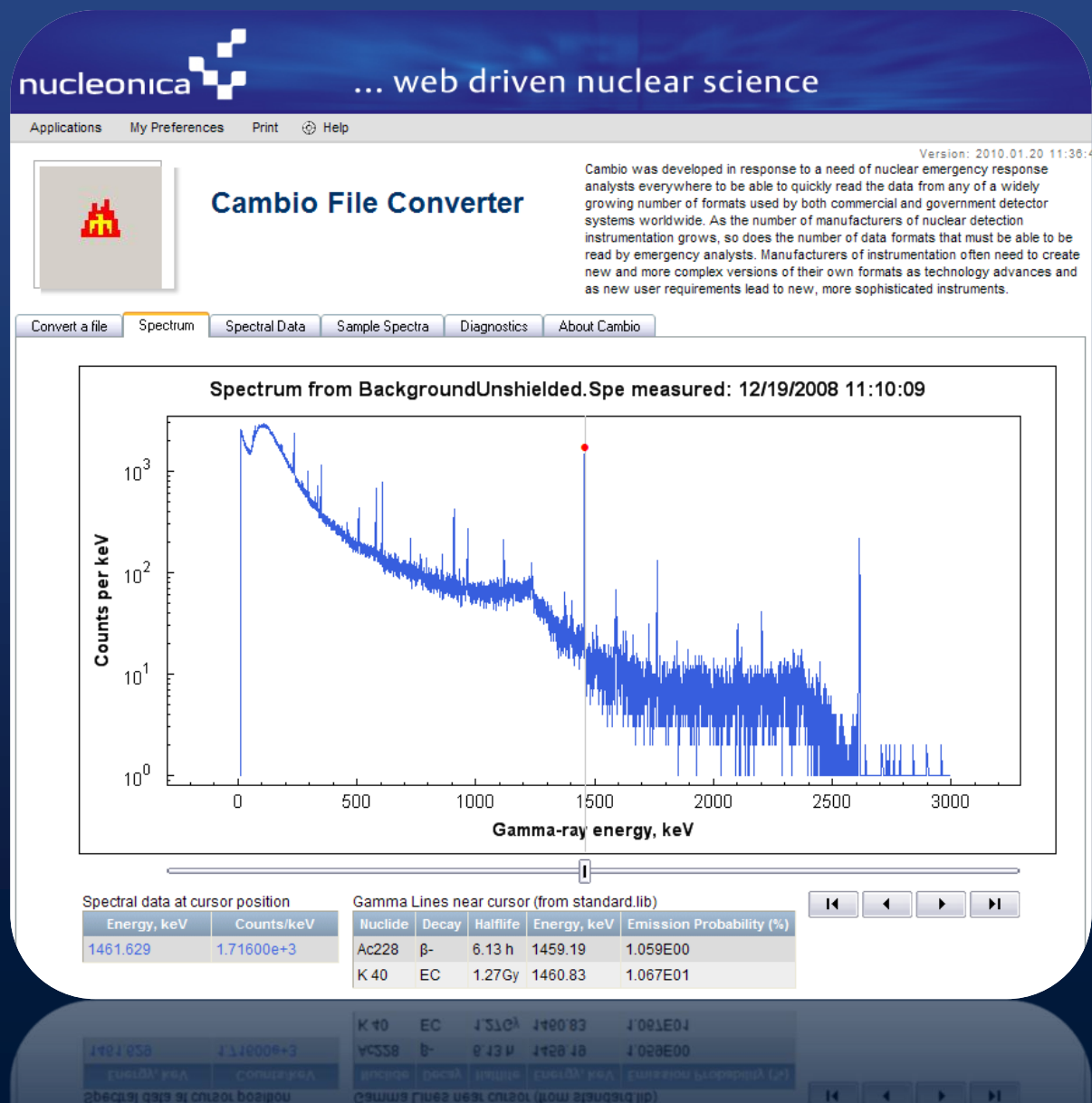
HPGe



Cambio File Converter...

Cambio is an application which can read every spectrum format, display the spectrum and convert it to a more convenient form

- Display
- Convert
- Analyse



Thanks!





... web driven nuclear science

Applications My Preferences Print Help

Version: 201



Cambio File Converter

Cambio was developed in response to a need of nuclear emergency response analysts everywhere to be able to quickly read the data from any of a widely growing number of formats used by both commercial and government detector systems worldwide. As the number of manufacturers of nuclear detection instrumentation grows, so does the number of data formats that must be able to be read by emergency analysts. Manufacturers of instrumentation often need to create new and more complex versions of their own formats as technology advances and as new user requirements lead to new, more sophisticated instruments.

Convert a file

Spectrum

Spectral Data

Sample Spectra

Diagnostics

About Cambio

Step 1

Please select a file to be converted

Browse...

Step 2

Choose the format to convert to
(instrument / 3rd party software)

laeaSpe

Step 3

Convert the file using Cambio

Convert

Step 4

Download the converted file

Download

- laeaSpe
- laeaSpe
- N42Xml
- OrtecChn
- DetectiveSpc
- IdentiFinderSpc
- Gr130Dat
- Gr135Dat
- GadrasPcf

Uploaded file:

C:\Documents and Settings\magiljo\Desktop\Eu152_HPGe.txt

Converted file:

C:\Nucleonica\PrecompiledWeb\Application\Cambio\CambioFolders\3a0ab7ae-e428-422e-a8e4-1479a123d076\

Converted file:

C:\Documents and Settings\magiljo\Desktop\Eu152_HPGe.txt



Cambio File Converter

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Convert a file

Spectrum

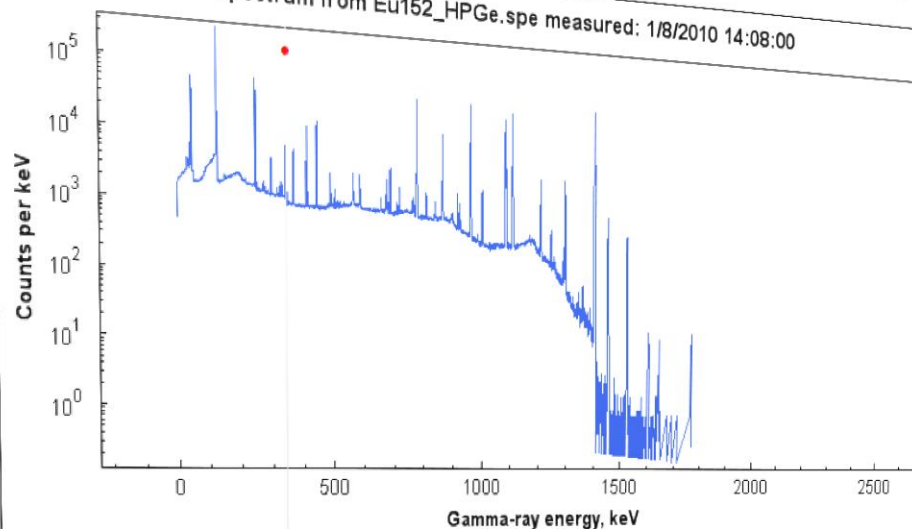
Spectral Data

Sample Spectra

Diagnostics

About Cambio

Spectrum from Eu152_HPGe.spe measured: 1/8/2010 14:08:00



Spectral data at cursor position

Energy, keV	Counts/keV
345.021	1.60039e+5

Gamma Lines near cursor (from standard.lib)

Nuclide	Decay	Half-life	Energy, keV	Emission Probability (%)
Eu152	EC	13.33 y	344.28	2.659E+01
Bi210	α	3.00My	344.95	7.629E-01
Pu239	α	24.11ky	345.01	5.560E-04

